

Mr. Paul Rosasco  
Engineering Management Support, Inc.  
7220 West Jefferson Ave. Suite 406  
Lakewood, CO. 80235

ATTN:

RE: Draft Comprehensive Phase 1 Report, for West Lake Landfill Operable Unit-1

Mr. Rosasco:

EPA has reviewed the Draft Comprehensive Phase 1 Report for the West Lake City Landfill Superfund Site, dated December 2015. Provided below are the EPA's comments on this document submittal. In accordance with the RI/FS Administrative Order on Consent and upon receipt of these comments within calendar 10 days, please provide EPA with a revised Comprehensive Phase 1 Report that incorporates these comments.

If you have any comments or questions, please feel free to contact me either by e-mail at [vann.bradley@epa.gov](mailto:vann.bradley@epa.gov) or by phone at 913-551-7611.

Sincerely,

Bradley Vann  
Remedial Project Manager  
Missouri/Kansas Remedial Branch  
Superfund Division

cc: Ryan Seabaugh, Missouri Department of Natural Resources  
Robyn V. Kiefer, U.S. Army Corps of Engineers

#### Administrative Comments:

1. The scope of this document is to provide a summary of the Phase 1 data sets and not to provide speculation or specific site recommendations related to potential subsurface physical barriers or potential future excavations at the site. Please reconcile the text to eliminate the inclusion of speculative sentences and wording in relation to these items. Recommendations related to the data set findings are welcome and appropriate for this type of Report.
2. Section 1, Page 2, Last Paragraph: The identification of RIM in the SW and presence of overlying waste in the North Quarry area precludes a physical barrier only if the intent is to ensure that 100% of impacted material is behind the physical barrier.
3. Acronym List: Please revise the text by adding the following new term "Isolation Barrier" and the associated acronym "IB". Also revise the text of the Report as appropriate to incorporate this acronym.
4. Section 4.1.1, page 53, 1<sup>st</sup> sentence of the third paragraph, Please spell out Soil Behavior Type (SBT) as this is believed to be the first use of the term.
5. Section 3.8, last sentence of the section uses the term "Rotosonic". Please delete this term from this section and check the document for its use elsewhere as it is believed to be a registered trademarked term. The term "Sonic drilling" is sufficient for use in this document.
6. Section 3.10.2, 2<sup>nd</sup> to last sentence, please insert the acronym "(TLD)" after "thermoluminescent dosimeter".
7. Section 4.1.1, 2<sup>nd</sup> Bullet: This bullet defines the waste materials as ". . . containing municipal solid wastes, sludges, construction and demolition material, daily or intermediate soils cover material, and other non-naturally occurring fill materials (e.g. soil or aggregate that may have been associated with access roads or random fills placed in conjunction with historic quarry operations in or adjacent to Area 1 or sediment deposited in historic low lying areas during quarry and/or MSW disposal operations in and around Area 1)."

Further inspection of the RI borings and the recent sonic borings indicate a high order of vertical and horizontal heterogeneity exists in the landfill, or in other words, any of the indiscriminate materials mentioned in the paragraph can occur at any depth within the landfill. This will require conservative assumptions on the landfill mass properties during the design and construction process.

8. Footers, the footer(s) for the document body text have a date included of "12/16/15", while the date provided on the footers on the Tables is shown as "12/11/15". To avoid possible confusion on the official date of the document and the data presented within, please reconcile the date(s) for all pages and inclusions to match when appropriate.
9. Tables Section, all Tables, the tables include various qualifiers, abbreviations, and acronyms that are not listed or explained such as laboratory qualifiers (J, U, J+, etc.) and also other

abbreviations (RL, Q, CV, CSU, etc.) Please consider adding “Notes” or footnotes to each table with explanations for the various qualifiers, abbreviations, and/or acronyms. The added Notes or footnotes would help to explain to readers what the various qualifiers and other acronyms/abbreviations represent.

10. Tables Section, Tables 11 and 12, the font used for these two tables is very small and difficult to read. Please consider reformatting/sizing the tables to make them easier to read. Furthermore, Table 11 uses the term “Sample Date” while Table 12 uses the term “Collection Date”. Please consider using the same terminology for both/all tables where appropriate to avoid possible confusion on the terminology. If the terminology is intended to be different for these tables please consider adding a footnote to the tables to explain this nuance.

Specific Review Comments:

1. Page 1, Section 1 - Introduction, 4<sup>th</sup> paragraph, please delete the last sentence of this paragraph: “The presence of RIM in this southwestern portion of Area 1...” This information is not appropriate in this data report.
2. Page 1, Section 1 - Introduction, 5<sup>th</sup> paragraph: Please delete this entire paragraph. The text presented in this paragraph is not appropriate for this data report.
3. Section 1.1, End of 2<sup>nd</sup> Paragraph: Recommend changing last sentence to read "Evaluation of the need for, as well as the scope and possible engineering methods for, implementing a potential isolation barrier within the West Lake Landfill OU-1 Area 1 are under the jurisdiction of EPA, which retained the US Army Corps of Engineers (USACE) to assist with technical evaluation of proposed isolation barrier alternatives."
4. Section 1-3<sup>rd</sup> Paragraphs; Section 1.3; Section 2.3, Last paragraph; Section 3.0, 1st full Paragraph; Section 3.6, 1st bullet; and Section 3.7.3: Multiple locations throughout the report state, in one way or another, that the Phase IA, 1B, and 1C GCPT and 1D Core Drilling investigations were designed and implemented to obtain the necessary geotechnical data (stratigraphy, nature, and geotechnical properties of subsurface materials) to support a design and possible construction of a isolation barrier, or that correlated CPT data was potentially indicative of geotechnical parameters of the landfill waste mass. The following items in the Comprehensive Phase 1 Report appear to be in conflict with the above statement:
  - 5th full paragraph of section 3.6, states "Application of the CPT technology and the CPT's soil behavior types (SBT) was not designed or intended for characterizing non-native geologic materials such as MSW. The technology was utilized here as a way of identifying the base of trash/top of alluvium or bedrock."
  - And "Interpretation of specific lithologies or waste materials based on the CPT responses obtain during the Phase 1 investigation is only considered to be an approximate, qualitative indication of the potential materials encountered and the depth intervals to the interfaces between the various materials within the overall waste mass."

- 2nd last paragraph of section 4.1.1 repeats this statement "Application of the CPT technology and the CPT's soil behavior types (SBT) was not designed or intended for characterizing non-native geologic materials such as MSW."

EPA and USACE agree that the nature and layering of the materials in the landfill mass have only been approximately and qualitatively described and that no geotechnical design parameters for the landfill wastes (unit weight, shear strength, etc.) have been determined by this exploration program. Please clarify in the text of the Report where appropriate, that the geotechnical data/information collected is adequate to support design considerations for the isolation barrier.

5. Section 2.4, Paragraph 3: Recommend that EMSI state in last sentence that RIM will refer to waste material containing radionuclides at levels above those deemed appropriate for unrestricted use (7.9 pC/g). This is proposed so there is no ambiguity on the unrestricted use level.
6. Section 2.4, 2nd to Last Paragraph: This paragraph documents the horizontal extent of radiological occurrences as approximately 4 acres in Area 1 and approximately 22 acres in Area 2 based upon previous data. There is not an updated estimate of extent of radiological occurrences in acres to compare it with in later sections (ie, section 4). Should that information be included so it is understood what the area extent is (based on current data)?
7. Section 2.5, 2<sup>nd</sup> to Last Paragraph: The last sentence in this paragraph states "In general, a strong correlation has been observed in site water levels in alluvial wells when compared with river stage and precipitation over time, as would be expected for an unconfined system". This site is located approximately 1-1/2 miles from the nearest point of the Missouri River. USACE questions that at that distance, the river levels have a direct impact on the water levels at the site. The piezometric conditions are probably more directly correlated with local rainfall and regional groundwater levels.
8. Section 2.5, page 15, last sentence of the last paragraph, Please delete this sentence related to groundwater levels or provide specific information with references for the depths of RIM in relation to the measured and documented groundwater levels including seasonal trends located beneath Areas 1 and 2.
9. Section 2.6, Page 15: The statement regarding the current location and past movements of the SSE is speculative, please delete this paragraph from the report.
10. Section 2.6, page 15, 3<sup>rd</sup> paragraph, Please delete the last sentence of the 3<sup>rd</sup> paragraph that starts with "Both of these reports concluded..." Restating conclusions from other studies and reports and not appropriate or supportive of the scope of this data report.
11. Section 2.6, 3rd Paragraph: It would be helpful for the reader if the standards for radon emissions under NESHAP and UMTRCA were identified here where they are referenced. It would also be helpful to the reader if the calculated increase in radon referenced were also

listed in this section of the Report.

12. Section 3, page 17, first paragraph following bullets at top of the page, last sentence of the paragraph that reads “The assumption underlying this approach...” Please delete the last sentence of this paragraph as the prior assumptions are not germane to summary of the activities or the results.
13. Section 3.1, Paragraph 4: Field notes related to the readings that show gamma measurements by GPS locations for the clearance of the vegetation during Phase 1A, 1B, 1C could not be found in the Report. Please include this information as an appendix to the Comprehensive Phase 1 report.
14. Section 3.5, Drill Site Numbering, 1<sup>st</sup> paragraph, starting with the following text “As depicted on Figure 6, Phases 1A, 1B, and 1C included...” Please consider copying this information and adding it/pasting it into Section 1.2 of this document as it supplies a good summary of the field work conducted and it would be helpful to readers to see this summary earlier in the text.
15. Section 3.5, Paragraph 3: Recommend clarifying that the location of the borings were not only determined based upon pre-defined locations, but that those pre-defined locations were selected based upon the Phase 1A, 1B, and 1C data and accessibility due to the steep slopes of the North Quarry muffin top. Also please discuss the conceptual site model and the reason further testing over the North Quarry high wall was not conducted (because records indicate that the North Quarry was still being excavated after 1973 when the radiological waste was documented as be placed in WLL. This section should also reference the information contained in Section 3.12 of the Report.
16. Section 3.7.2, 1<sup>st</sup> sentence, this sentence states “...a few additional soundings along some of the prior Phase 1A transect paths...” Please replace “a few” with the actual number of soundings, which is assumed to be 5.
17. Section 3.8.5, 1<sup>st</sup> sentence, Please replace the text “...less than originally expected...” with “low”.
18. Section 3.8.6, last sentence of the section. Please change the word “consulted” to “compared”.
19. Section 3.9.1.3, Page 41: How was the 200 - 250 cpm screening level determined? Does this correlate to ~5 pCi/g Th-230/Ra-226? Please clarify in the text.
20. Section 3.10.3, Page 45: Have surface dose rate measurements been performed? If so, are there areas that exceed requirements for posting as radiation areas?
21. Section 3.10.3.4, last sentence has a superscript “<sup>3</sup>” that does seem to match the text and foot notes at the bottom of the page. Please check and reconcile as appropriate.

22. Section 3.10.3.6, Page 48: It would be helpful to know what sort of personnel decontamination was performed. Frisking with a 44-9 GM?
23. Section 3.11, Last sentence, please revise this sentence as follows: "IDW will be disposed of in accordance with applicable federal and state requirements."
24. Section 4.1.4, page 56, first full paragraph on the page discussing water levels, Please state if the encountered water levels are believed to influenced by the leachate pumping system(s) located in the North Quarry. Also, please provide the water levels encountered for the "...16 GCPT which were outside the main waste body on the east side of the investigation area."
25. Section 4.1.4, page 56, last paragraph of the section, please delete this paragraph related to water elevations and open excavations, as it is speculative and not directly related to the data presented in this report.
26. Section 4.2, Item 1: Please provide an estimate of height above the estimated 1975 elevation that the GCPT1-2 gamma level was encountered. This is recommended to be consistent with item 2, that indicates GCPT 1C-6, 1C-6T, & 1C-6T1 are a "few feet" above the estimated 1975 elevation.
27. Section 4.2, Item 3: Recommend indicating an estimate of distance below the estimated 1971 and 1975 elevation that the 1D-7, 1D-9, and 1D-15 gamma level was encountered. Additionally, item 3 doesn't mention borings 1-2 and 8-1 which are included on page 60, 3rd paragraph as also being below the estimated 1971 and 1975 elevation. Recommend these be included in item 3 as well along with a reference to section 4.3 for discussion. Also, discuss how surface of pre-1973 disposal (as seen in 1971 aerial) shows topographic low areas which is why EPA/USACE recommend sampling for confirmation in this area. It is not surprising based on the 1975 post disposal slope of pile to find RIM in this location and at depths identified during the Phase 1D effort.
28. Section 4.2, Page 57, 2<sup>nd</sup> Paragraph: This paragraph discusses baseline gamma levels from 2 separate investigations. For one investigation the baseline gamma level is 6,000 cpm and for the other it is 1,500 cpm. Please explain in the text of this section as to why the baseline gamma levels differ.
29. Section 4.3. Page 61, 3rd Paragraph: Recommend evaluation of the accuracy of topographic maps as an additional possibility for the observed disconnect between depth of RIM and historic topographic elevation.
30. Section 4.3, page 61 and 62, Please delete the last paragraph of this section as it supplies unsupported speculations on the data and further implies findings related to fate and transport of contaminants and is not appropriate language for this data report.
31. Section 5, page 66, Item 1: Terminology currently used is "threshold values" as opposed to residential use criteria. Please revise the text in this Section and elsewhere as appropriate to use the current/same terminology throughout the Report so as not to confuse readers.

32. Section 5, page 66, numbered bullets, bullet 4, Please delete the following text from this numbered bullet, “..., thus making installation of a potential thermal isolation barrier impractical (i.e. there is no area in the southern portion of Area 1 that does not contain RIM that could be used for installation of a physical barrier.” as this language is speculative. The scope of this document is to provide a summary of the Phase 1 data sets.
33. Section 5, page 68, numbered bullets, bullet 3, please delete this bulleted item. EPA continues to evaluate the site and the Phase 1 data sets in relation to the extent of RIM and the need for additional data.
34. Section 5, page 68, numbered bullets, bullet 4, please delete this bulleted item. EPA continues to evaluate the site and the Phase 1 data set. The scope of this document is to provide a summary of the Phase 1 data sets and not to provide specific recommendations related to physical barriers.
35. Figure 2: Change Buffer Zone boundary to blue and add details in legend for color distinction.
36. Figures 12 and 13: Renumber as 12a/13a and add two additional figures (12b and 13b) that layers the information presented over the 1971 and 1975 aerials. This information is important in order to capture and reference in this report, as the visual surface is better supported along with the wireline overlay presented.
37. Figure 17: Legend states "Preliminary extent of RIM". This investigation was to characterize the extent of RIM so it should not be "preliminary". Please revise the figure.
38. Tables Section, Table 5: The highlighted boxes are labeled as "Restricted Use Levels", but each radionuclide column labels it as "limit". This can be confusing to the public. Recommend that the table be revised to use consistent terms.
39. Table 6: Recommend highlighting the Combined Thorium levels that are above the "unrestricted use" limit of 7.9pCi/g in yellow to be consistent with Table 5. Recommend also labeling the 7.9pCi/g level as "unrestricted use limit". Please also consider including qualifier notations for each qualifier.
40. Table 7: Recommend highlighting the Radium levels that are above the "unrestricted use" limit of 7.9pCi/g in yellow to be consistent with Table 5. Recommend also labeling the 7.9pCi/g level as "unrestricted use limit". Please also consider including qualifier notations for each qualifier.
41. Table 8: Recommend highlighting the Uranium levels that are above the "unrestricted use" limit of 54.4pCi/g in yellow to be consistent with Table 5. Recommend also labeling the 54.4pCi/g level as "unrestricted use limit".
42. Table 11: Recommend entering the "unrestricted use" limit for each of these radionuclides

either within the table at the top or below the table with the highlight legend. Also recommend highlighting in yellow those that exceed the unrestricted use limit.

43. Table 12: Recommend entering the "unrestricted use" limit for each of these radionuclides and also highlighting in yellow those that exceed the unrestricted use limit.
44. Appendix D, Graphical Summaries of Phase 1 investigation (pages 1677 to 1791): These plots are very helpful, including much of the data gathered at each site by the multi-phased Phase 1 investigation. These plots also include the continuous traces of the GCPT tip pressure, sleeve friction, and computed friction ratios. As stated in sections 3.6 and 4.1.1, "Application of the CPT technology and the CPT's soil behavior types (SBT) was not designed or intended for characterizing non-native geologic materials such as MSW." These graphical summaries should be conspicuously annotated with this comment to prevent anyone's use of the GCPT data to infer geotechnical design properties.